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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/636,484	08/10/2000	Walter David Braddock IV	DB3	6691

7590 01/28/2002
David Braddock
Osemi Inc
300 First St NE
Rochester, MN 55906

EXAMINER

KANG, DONGHEE

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 01/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/636,484

Applicant(s)

WALTER DAVID BRADDOCK

Examiner

Donghee Kang

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Specification

Arrangement of the Specification

1. The following order or arrangement is preferred in framing the specification and, except for the reference to the drawings, each of the lettered items should appear in upper case, without underling or bold type, as section headings. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) Title of the Invention.
- (b) Cross-Reference to Related Applications.
- (c) Statement Regarding Federally Sponsored Research or Development.
- (d) Reference to a "Sequence Listing," a table, or a computer program listing appendix submitted on compact disc (see 37 CFR 1.52(e)(5)).
- (e) Background of the Invention.
 - 1. Field of the Invention.
 - 2. Description of the Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) Brief Summary of the Invention.
- (g) Brief Description of the Several Views of the Drawing(s).
- (h) Detailed Description of the Invention.
- (i) Claim or Claims (commencing on a separate sheet).
- (j) Abstract of the Disclosure (commencing on a separate sheet).
- (k) Drawings.
- (l) Sequence Listing, if on paper (see 37 CFR 1.821-1.825).

2. The abstract of the disclosure does not commence on a separate sheet in accordance with 37 CFR 1.52(b)(4). A new abstract of the disclosure is required and must be presented on a separate sheet, apart from any other text.

3. The spacing of the lines of the specification is such as to make reading and entry of amendments difficult. New application papers with lines double spaced on good quality paper are required.

- (f) Brief Summary of the Invention.
- (g) Brief Description of the Several Views of the Drawing(s).
- (h) Detailed Description of the Invention.
- (i) Claim or Claims (commencing on a separate sheet).
- (j) Abstract of the Disclosure (commencing on a separate sheet).
- (k) Drawings.
- (l) Sequence Listing, if on paper (see 37 CFR 1.821-1.825).

3. The abstract of the disclosure does not commence on a separate sheet in accordance with 37 CFR 1.52(b)(4). A new abstract of the disclosure is required and must be presented on a separate sheet, apart from any other text.

4. The spacing of the lines of the specification is such as to make reading and entry of amendments difficult. New application papers with lines double spaced on good quality paper are required.

Claim Objections

5. The claims are objected to because the lines are crowded too closely together, making reading and entry of amendments difficult. Substitute claims with lines one and one-half or double spaced on good quality paper are required. See 37 CFR 1.52(b).

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims **1-26 & 35-37** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 1 recites the limitation "the compound of gallium and oxygen", "the compound of gallium and oxygen and at least one or more rare earth elements", "the initial supporting gallium oxygen layer", and "said first".

Claim 2 recites the limitation "the initial layer of gallium oxygen compounds".

Claims 5 & 7 recite the limitation "the initial gallium oxygen compound layer".

Claim 8 recites the limitation "the initial gallium and oxygen compound layer".

Claim 14 recites the limitation "the compounds of gallium and oxygen compounds", "the first compounds of the compounds of gallium and oxygen and at least one or more rare earth elements", "said second layer", and "said first".

Claim 15 recites the limitation "the initial layer of gallium oxygen compounds".

Claim 19 recites the limitation "the initial gallium oxygen compound layer".

Claim 20 recites the limitation "the initial gallium and oxygen compound layer".

Claims 34-35 recite the limitation "the compound semiconductor substrate".

There is insufficient antecedent basis for this limitation in the claim.

Referring to claims 1 & 14, the phrase "***a layer composed of the compounds of gallium and oxygen and other gallium oxygen compounds positioned...***" is unclear as how they are present in the device. The compound of gallium and oxygen and the gallium oxygen are same. What is mean a layer composed of the compounds of gallium and oxygen and other gallium oxygen compounds?

the phrase "***but not limited to mixture of Ga₂O₃, Ga₂O***" is unclear as how they are present in the device.

Referring claims **8 & 20**, the phrase "***the initial gallium and oxygen compound layer and the gate insulator structure protects ...***" is misdescriptive because the initial gallium and oxygen compound layer is a part of the gate insulator structure.

Referring claim **26**, the phrase "***alternating layers comprised of gallium, oxygen, at least one rare earth element.***" is misdescriptive because first layer does not include the rare earth elements.

Claims **3-4, 6, 9-13, 15-25, & 37** are rejected since each includes the limitations of independent claims **1 & 14**.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

10. Claims **27-35** are rejected under 35 U.S.C. 102(e) as being anticipated by Passlack et al. (US 5,945,718).

Regarding claims **27-28 & 34-35**, Passlack discloses a metal-oxide-compound semiconductor field effect transistor comprising (Fig.1):
a compound semiconductor wafer structure (13) having an upper surface comprises a AlGaAs, InGaAs, and GaAs, wherein a compound semiconductor wafer structure is a

GaAs based semiconductor wafer; a gate insulator structure (14) positioned on upper surface of said compound semiconductor wafer structure; a stable refractory metal gate electrode (17) positioned on upper surface of said gate insulator structure; source and drain (21 & 22) ion implants self-aligned to the gate electrode; and source and drain ohmic contacts (19 & 20) positioned on ion implanted source and drain areas, wherein the compound semiconductor wafer structure comprises AlGaAs spacer layer (23) positioned between the gate insulator structure and a InGaAs channel layer and the AlGaAs spacer layer has a wider band gap than the InGaAs channel layer.

Regarding claim 29, Passlack discloses the wider band gap spacer layer has a thickness of 10-100 Å, which is in the claimed ranges.

Regarding claim 30, Passlack discloses the wider band gap spacer layer comprises AlGaAs.

Regarding claim 31, Passlack discloses the narrow band gap channel layer has a thickness of 100-250 Å, which is in the claimed range.

Regarding claim 32, Passlack discloses the narrow band gap channel layer is positioned between the wider band gap spacer layer and a buffer layer (25).

Regarding claim 33, Passlack discloses the narrow band gap channel layer comprises InGaAs.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

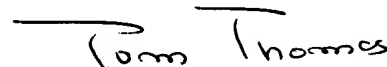
Childs et al. (US 5,124,762)

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Donghee Kang, Ph.D.
January 19, 2002

A handwritten signature in black ink that reads "Tom Thomas". The signature is written in a cursive style with a horizontal line above the first name.

TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800